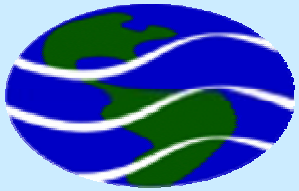


The Goddard DAAC

http://daac.gsfc.nasa.gov

HDF and HDF-EOS Experiences and Applications

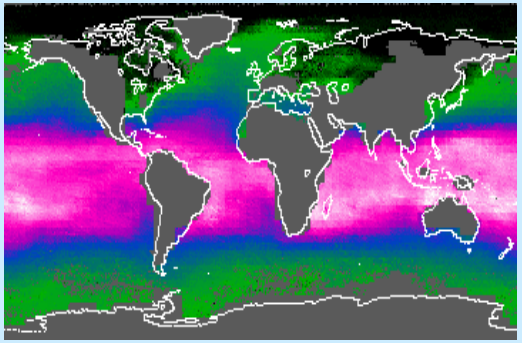
Presented by:

James Johnson,
SSAI

GES DISC DAAC

Science Disciplines

Atmospheric Dynamics

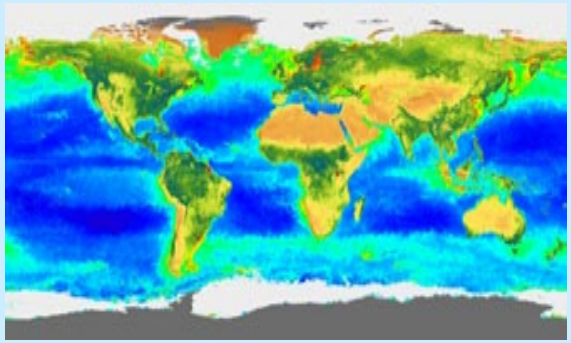


TOVS 1000 hPa Monthly Mean Specific Humidity

- TOVS Pathfinder
- Data Assimilation
- Terra MODIS
- Aqua AIRS
- Aqua MODIS

Black - completed
Red - active
Green - future

Global Biosphere

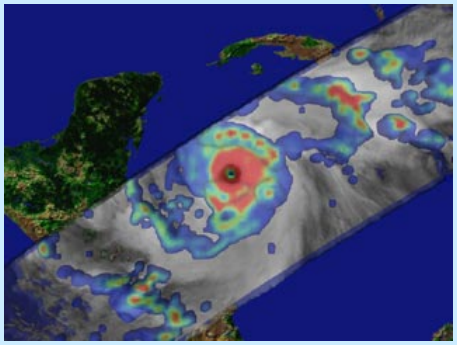


Monthly Ocean Chlorophyll and NVDI from SeaWiFS

Ocean Color
- CZCS
- OCTS
- SeaWiFS
- Terra MODIS
- Aqua MODIS

Land Biosphere
- AVHRR Pathfinder

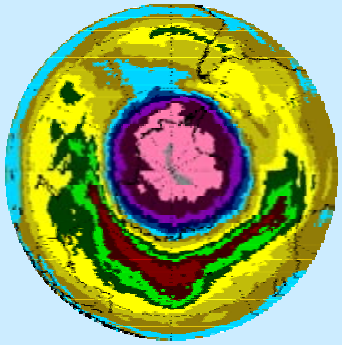
Hydrology



Hurricane Mitch as seen by TRMM

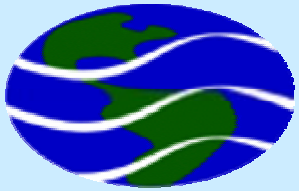
- Rainfall Climatology
- TRMM
- TRMM Field Experiments
- Aqua AIRS

Upper Atmosphere



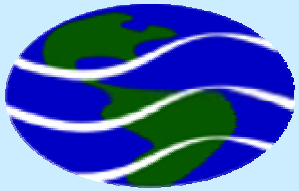
1999 Antarctic Ozone Hole as seen by TOMS

- Heritage BUV/SBUV
- Heritage LIMS
- Heritage TOMS
- UARS
- EP TOMS
- Aura HIRDLS
- Aura MLS
- Aura OMI
- SORCE



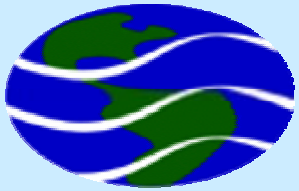
Primary Data Sets

Data Set	Format	Temporal Coverage
AVHRR Pathfinder	HDF (subsets in binary)	Jul 1981 to Oct 2001
CZCS	Binary	Oct 1978 to Jun 1986
DAO	Binary	Mar 1980 to Nov 1993
MODIS (Terra)	HDF-EOS	Dec 1999 to Present
SeaWiFS	HDF	Dec 1996 to Present
TOMS	HDF	Nov 1978 to Present
TOVS Pathfinder	HDF (subsets in binary)	Nov 1978 to Jul 1995
TRMM	HDF	Dec 1997 to Present
UARS	Binary	Sep 1991 to Sep 2001
DAS	*HDF-EOS*	*(soon)*
AIRS	*HDF-EOS*	*Mar 2002 (launch)*
Aura	*HDF5-EOS*	*Jul 2003 (launch)*
SORCE	*HDF5*	*Jul 2002 (launch)*



HDF & HDF-EOS Applications

- Universal Data Reduction Server (UDRS)
  - Distributed Oceanographic Data System (DODS)
  - Web Mapping Testbed (WMT-DODS)/OpenGIS
  - Live Access Server (LAS)/Ferret
  - Gridded Analysis and Display System (GrADS-DODS)
- Online data Analysis (OASIS)
- read_hdf generic reader
- other data set specific read software, including MODIS



Universal Data Reduction Server

- A virtual server consisting of:
  - DODS server
  - WMT-DODS server
  - GrADS-DODS server
  - LAS/Ferret
  - (others can be added)
- Allows a variety of discipline, interdisciplinary and applications users to access DAAC data

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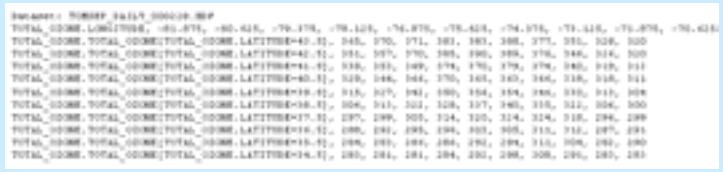
Distributed Oceanographic Data Server

- DODS developed by URI and UCAR
- a **protocol** for requesting and transporting data across the web
- Transparently supports multiple formats
- Subsetting performed at server end
- Supports various servers (netCDF, HDF, GrADS, MatLAB, FreeForm,…)
- Supports various clients (IDL, MatLAB, Ferret, LAS, GrADS, …)
- Various DAAC data sets served by DODS

(see http://daac.gsfc.nasa.gov/DAAC_DOCS/DODS.html)



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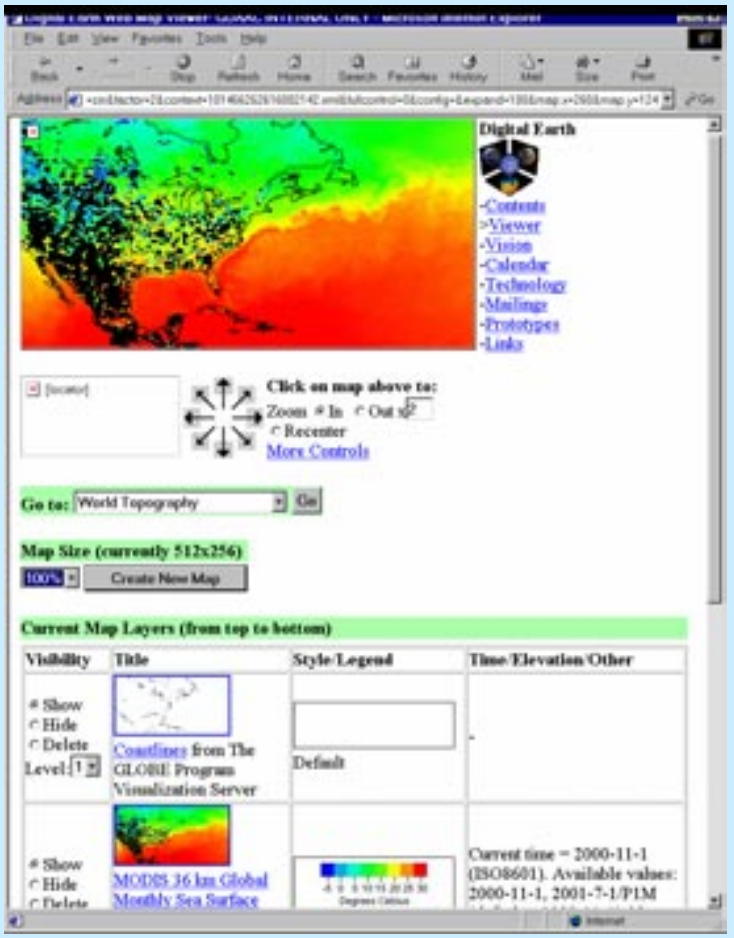
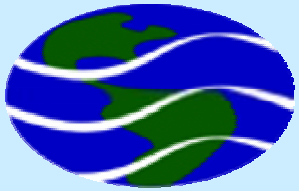
Web Mapping Testbed WMT-DODS Server

- OpenGIS consortium
- Import HDF & HDF-EOS data into GIS packages
- Supports geolocated images
- Interface to many DODS servers
  - DAAC
  - external

(see http://daac.gsfc.nasa.gov/daac-bin/viewer/viewer.cgi)





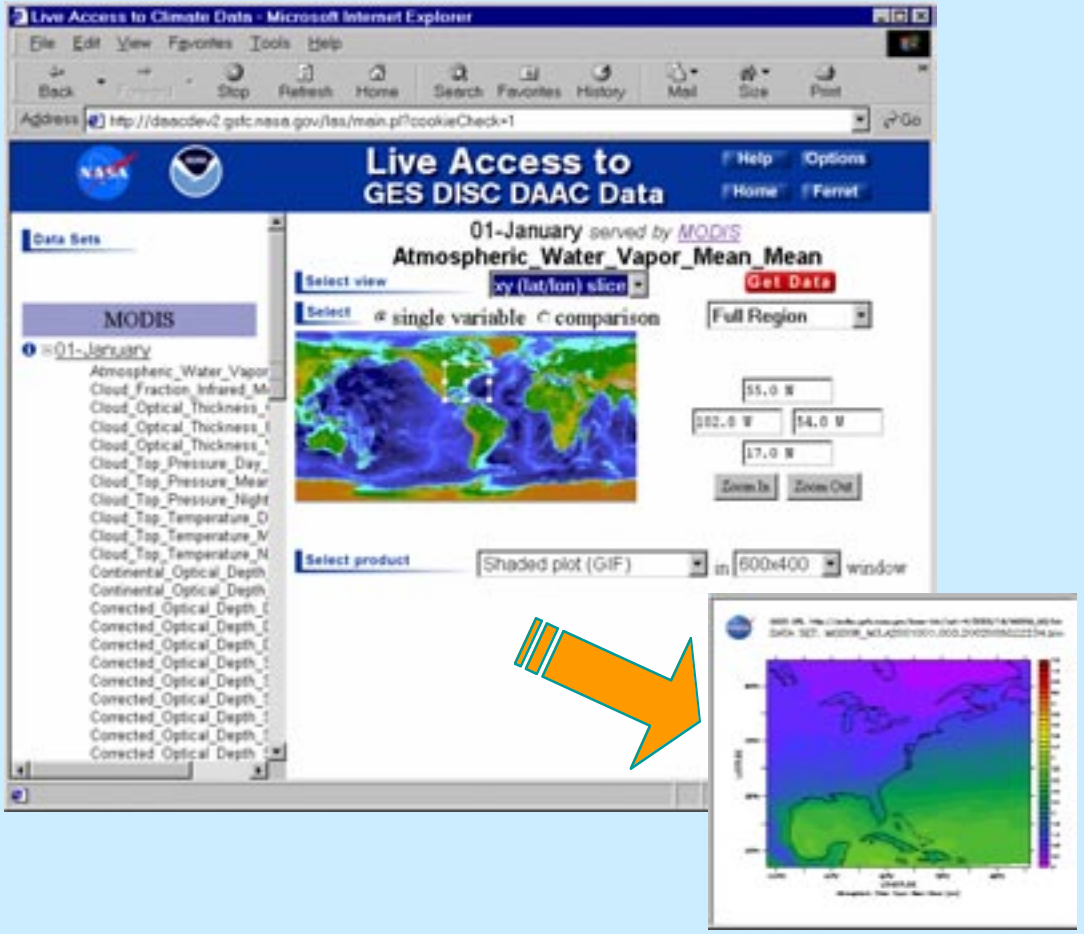
GrADS-DODS Server

- Developed by Center for Ocean-Land-Atmosphere Studies (COLA)
- Supports data analysis functions (statistical, smoothing, correlation, …)
- Subset data
- Work on single or multiple files
- Supports several data formats (HDF, netCDF, GRIB, binary, …)
- Interfaces with DODS
- DAAC Server to go operational later this year

GES DISC DAAC

Live Access Server/ Ferret

- LAS developed by NOAA
- Web GUI interface (Ferret)
- Interfaces with DODS
- Visualize data
- Subset data
- Save to various formats
- Custom data set specific templates added by DAAC
- Support for MODIS and SeaWiFS (coming soon)



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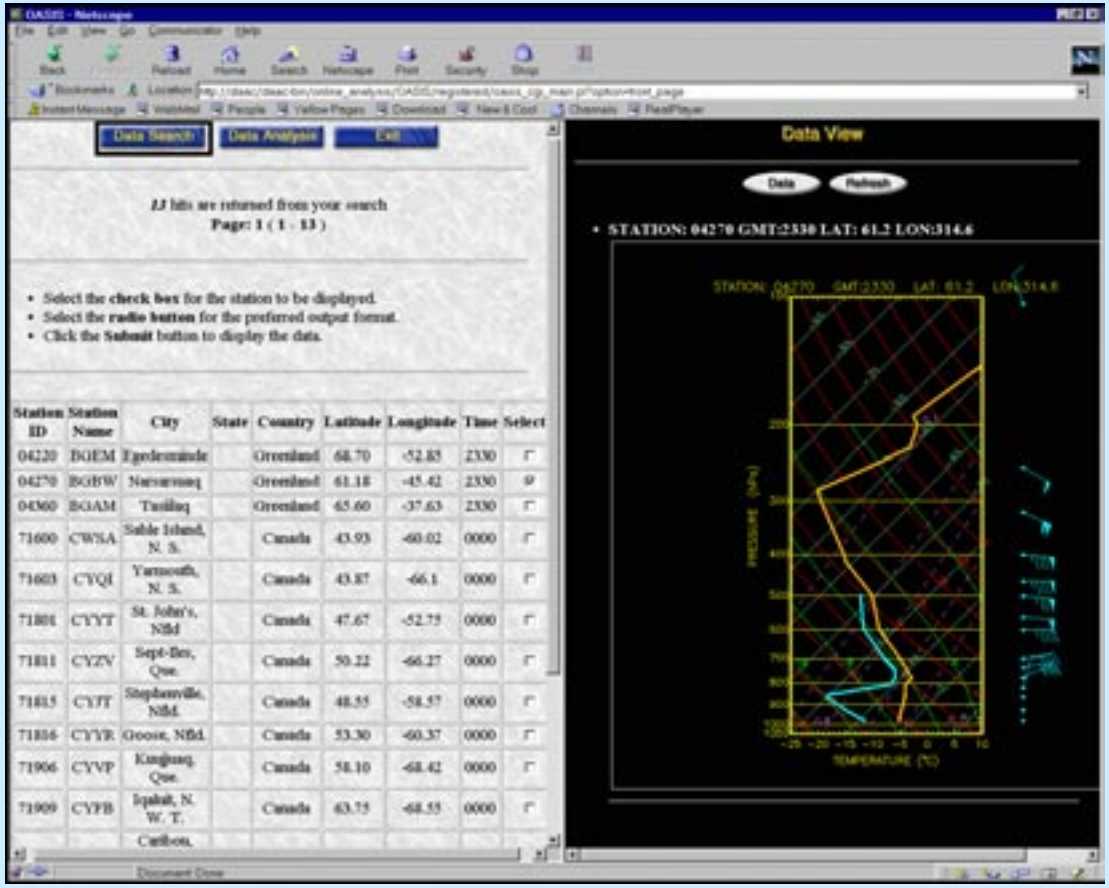
DAAC

Atmospheric Dynamics OASIS

- Web Interface
- Uses JAVA applets
- Perform data analysis online
- Intercomparison
- Visualize data
- Animations
- Supports DAAC atmospheric dynamics data
- HDF & HDF-EOS support coming soon



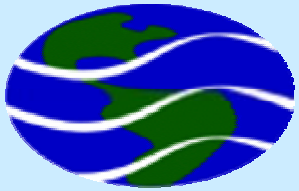
(see http://daac.gsfc.nasa.gov/CAMPAIGN_DOCS/atmospheric_dynamics/online_analysis/OASIS/html/)

read_hdf

- Interactive command line C program
- Generic, supports any HDF file
- Display hierarchical tree of useful objects (SDS, Vdata, Vgroup, Raster Images, Annotations)
- Subset data
- Output to ASCII or binary
- Also dump any obscure HDF object (DFTAG_NT, DFTAG_VERSION, etc.)

Other DAAC HDF Applications

- MODIS readers and visualization (IDL based)
  (see http://daac.gsfc.nasa.gov/CAMPAIGN_DOCS/MODIS/)
  - geoview
  - modis_atmos
  - simap
  - HDFLook-MODIS (collaboration between DAAC and the Laboratoire d'Optique Atmosphérique, France)
- SeaWiFS data best used with SeaWiFS' SeaDAS package
- TRMM data reader and IDL based TSDIS orbit viewer
- Other DAAC data sets include C, Fortran and/or IDL readers



HDF & HDF-EOS Issues

- **Large file sizes (MODIS, AVHRR)**
  - requires lots of bandwidth for downloading
  - end user needs lots of disk space
  - non-standard Grid projections
- **User frustration**
  - reluctance to accept HDF (prefer ASCII, binary, other formats)
  - download and install libraries (two for HDF-EOS)
  - confusion - HDF, HDF-EOS, and now HDF5
- **Poor HDF layout/implementation (or not self documenting)**
  - cryptic field and file names
  - no field level attributes or descriptions of file contents
  - too many fields
  - internal compression rarely utilized